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Choi et al.

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(54) **DIGITAL PRICE DISPLAYER AND ESL SYSTEM COMPRISING THE SAME**

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(73) Assignee: **LG Innotek Co., Ltd.**, Seoul (KR)

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G05B 23/02 (2006.01)

(52) **U.S. Cl.**
USPC **340/10.6**

(58) **Field of Classification Search**
USPC 340/10.6, 12.54; 235/375; 345/1.1; 705/20
See application file for complete search history.

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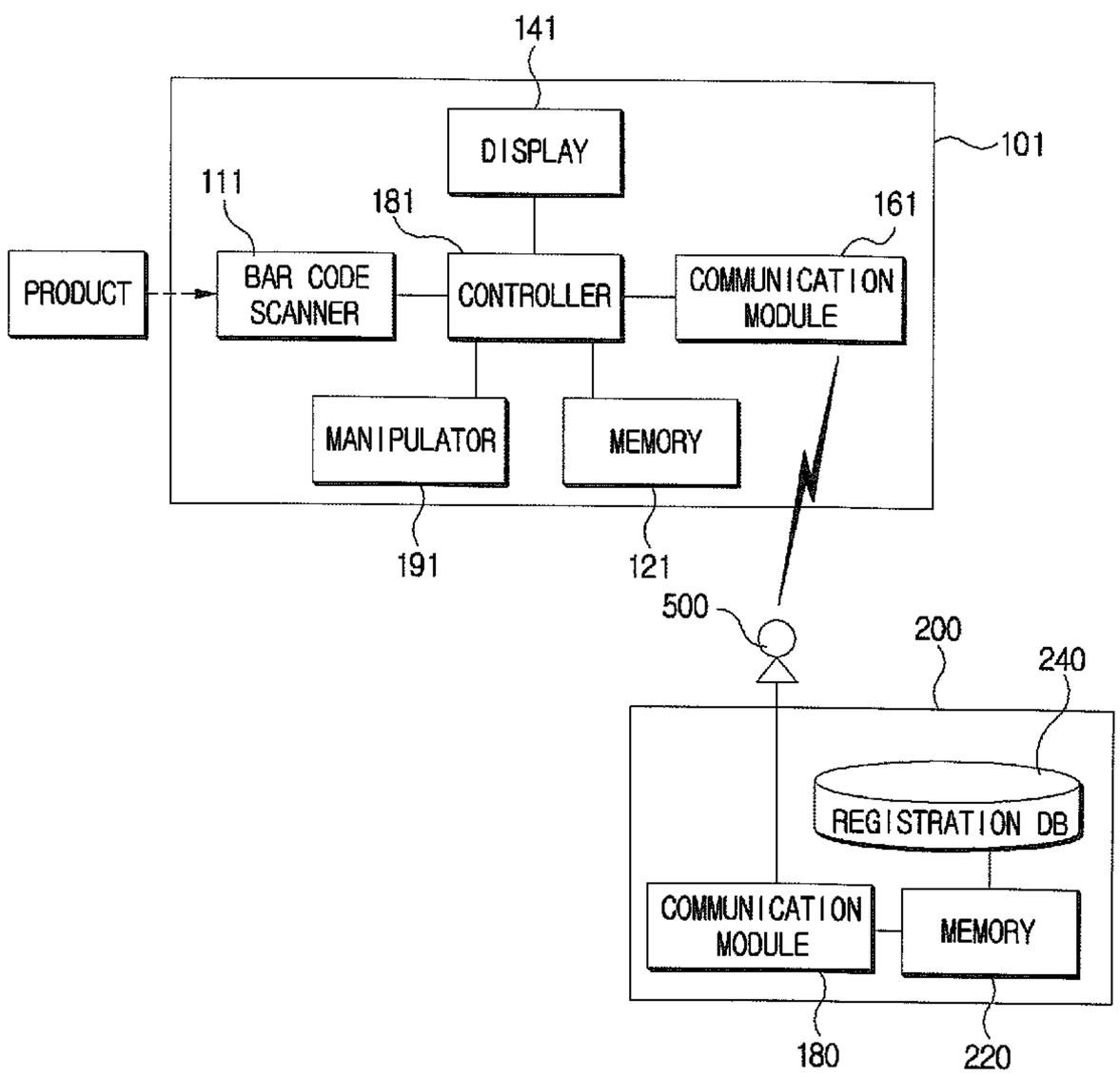
(74) *Attorney, Agent, or Firm* — Saliwanchik, Lloyd & Eisenschenk

(57) **ABSTRACT**

A digital price displayer and an ESL system comprising the same are provided. The displayer includes a power supplier mounted on a product-displayed shelf for supplying a power; a display main body attachable to and detachable from the shelf and receiving power supplied from the power supplier, and outputting a price, a specification and an advertisement image of a product displayed on the shelf; an accommodator provided at the shelf, formed at one side with an anode and formed at the other side with a cathode for the display main body to be electrically connected to the power supplier if the display main body is fixed to the accommodator; and a coupler provided at the display main body to be slidingly coupled with the accommodator for electrical connection with the anode and the cathode and to prevent from being separated from the accommodator.

13 Claims, 10 Drawing Sheets



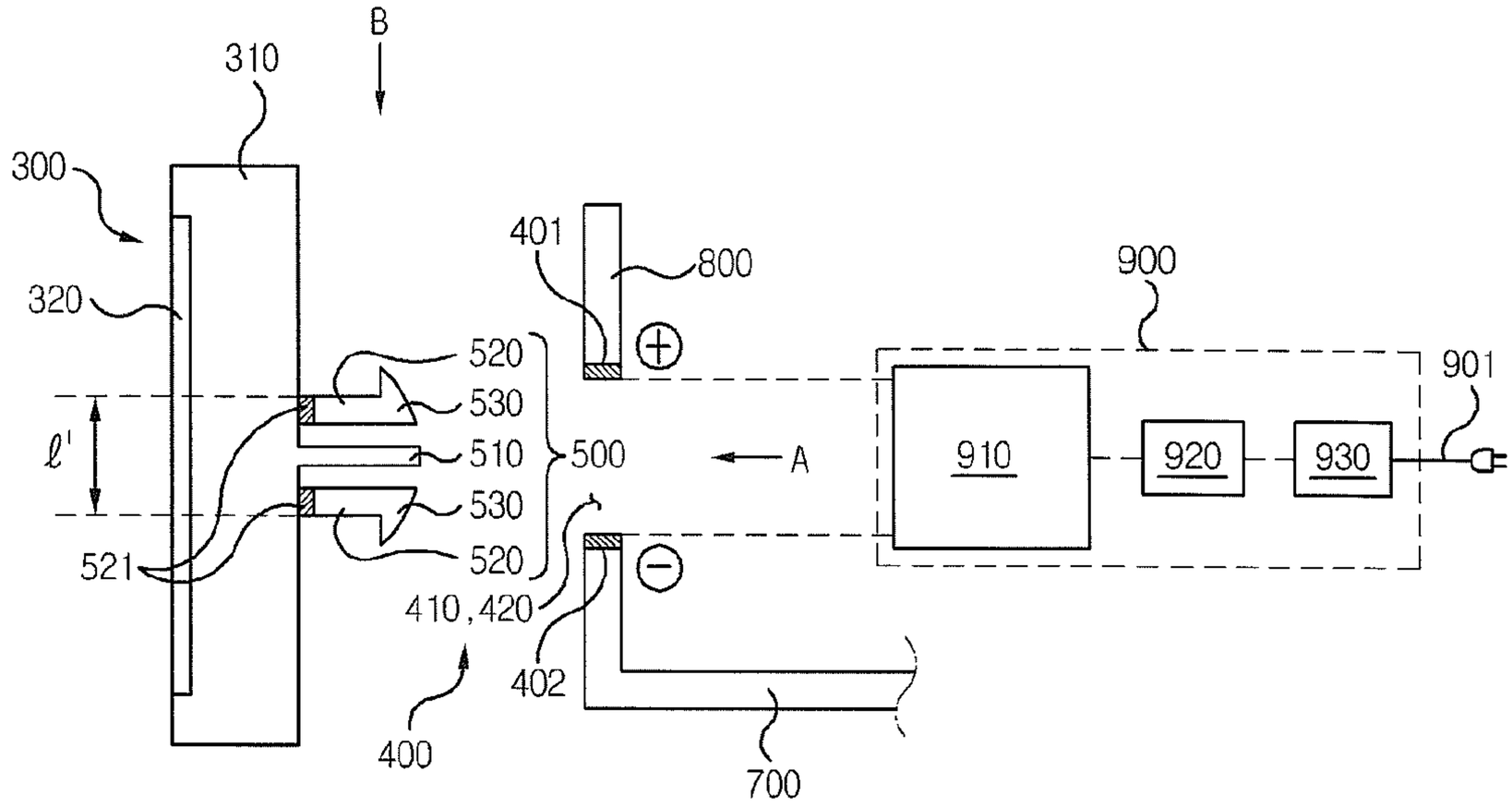

B
310
300
320
401
800
900
520
530
510
500
A
910
920
930
901
ℓ'
530
520
521
410,420
402
400
700

FIG. 1

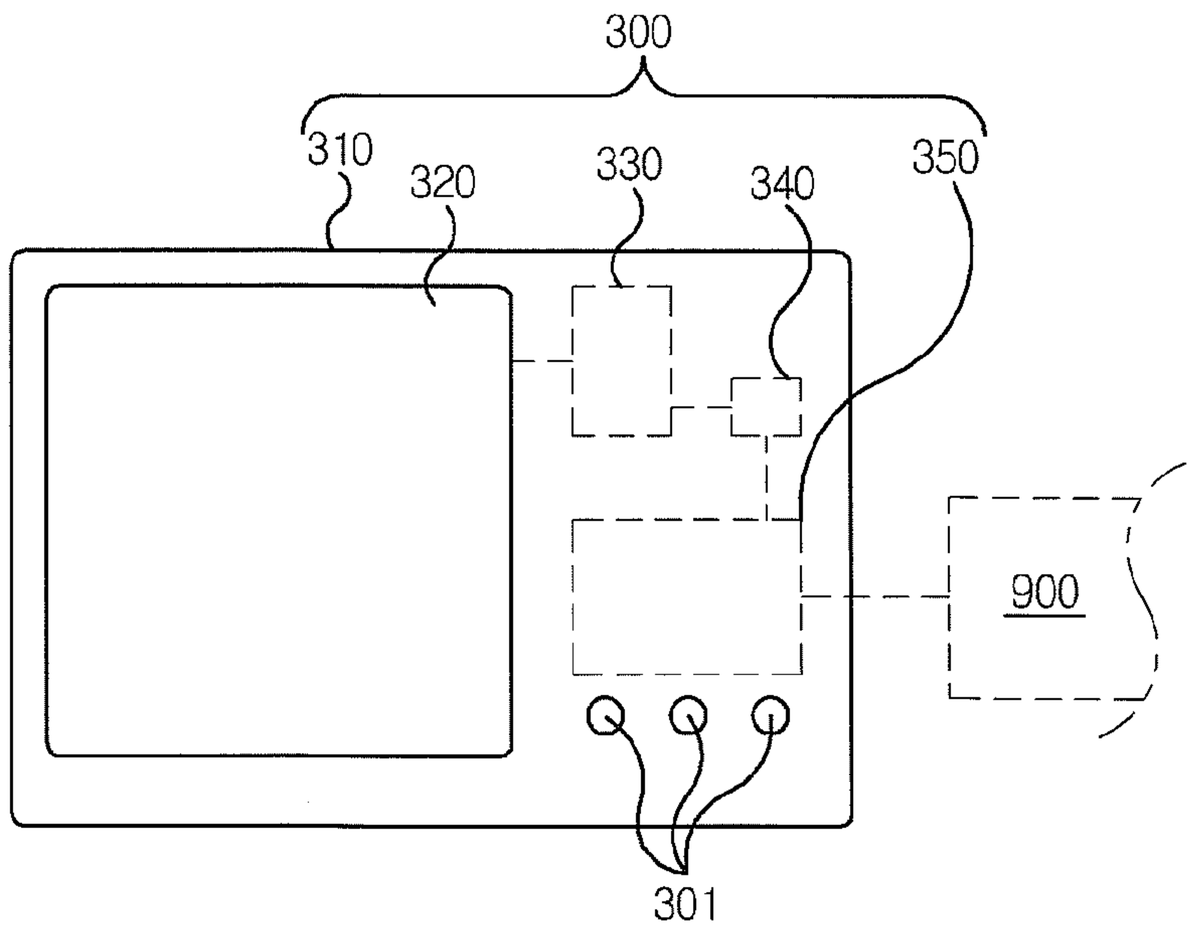

300
310
320
330
340
350
900
301

FIG. 2

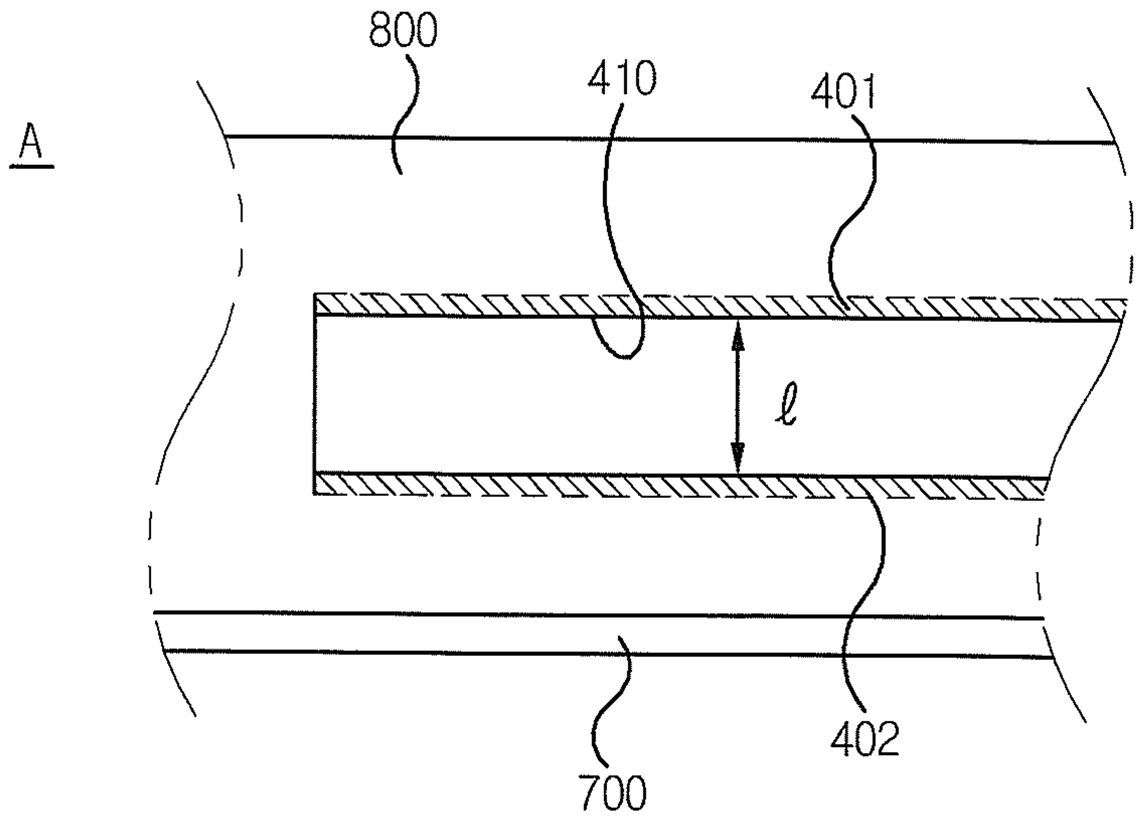


FIG. 3

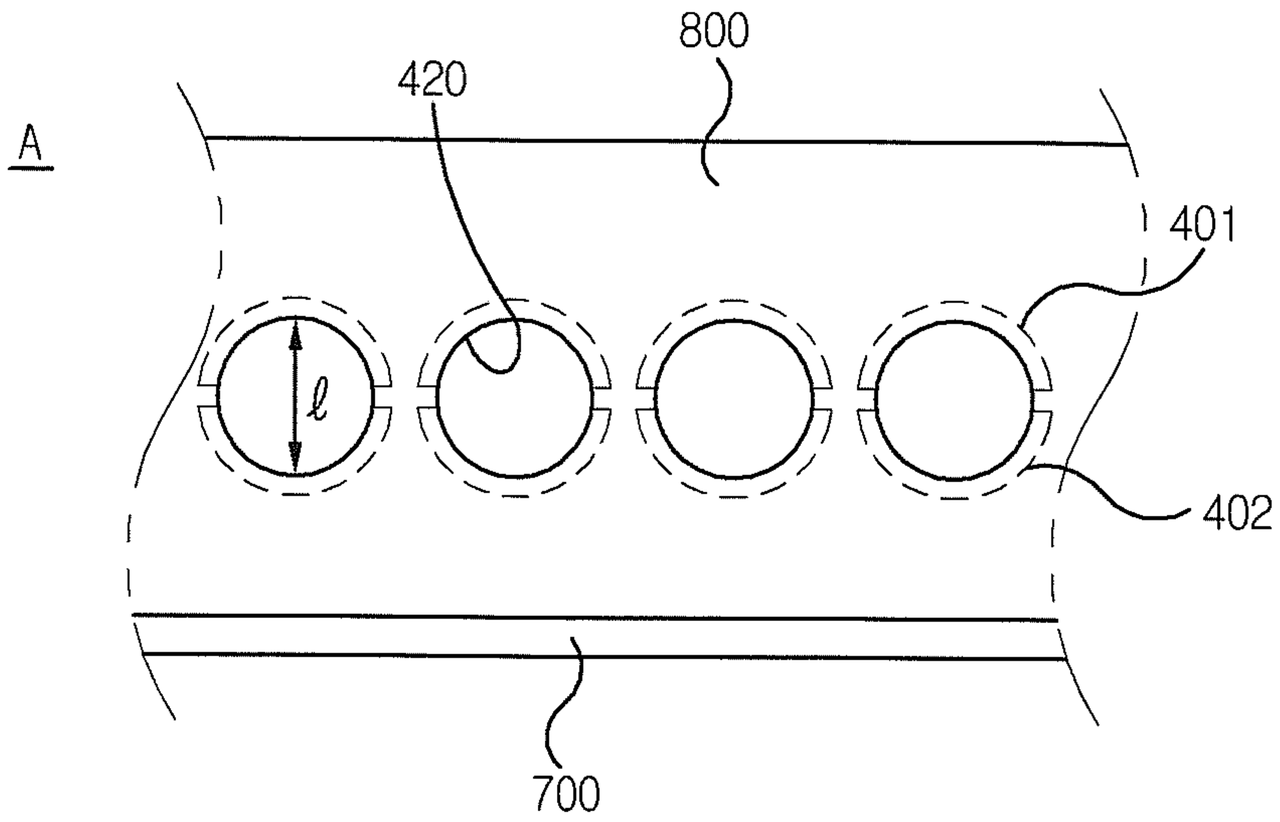


FIG. 4

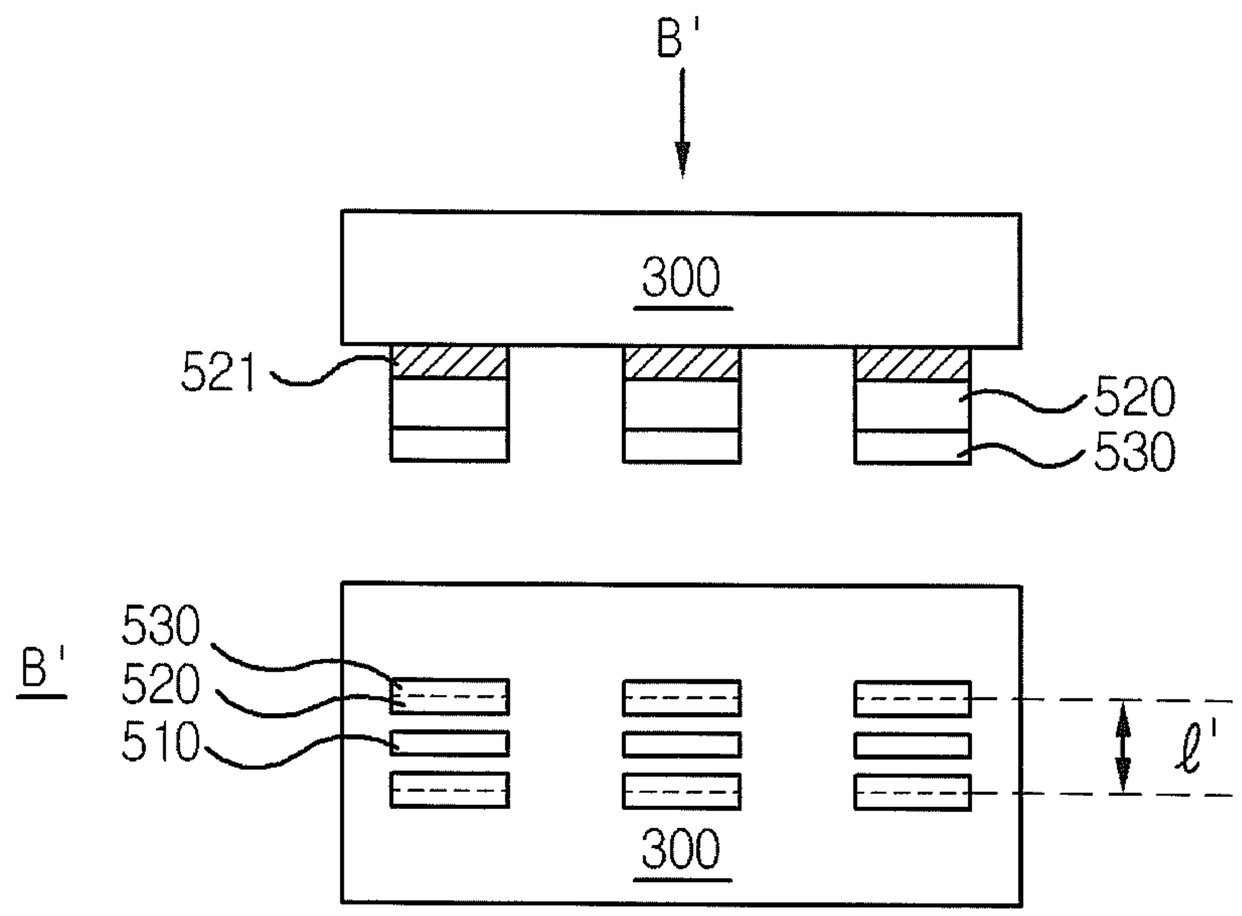

B'
300
521
520
530
B'
530
520
510
300
ℓ'

FIG. 5

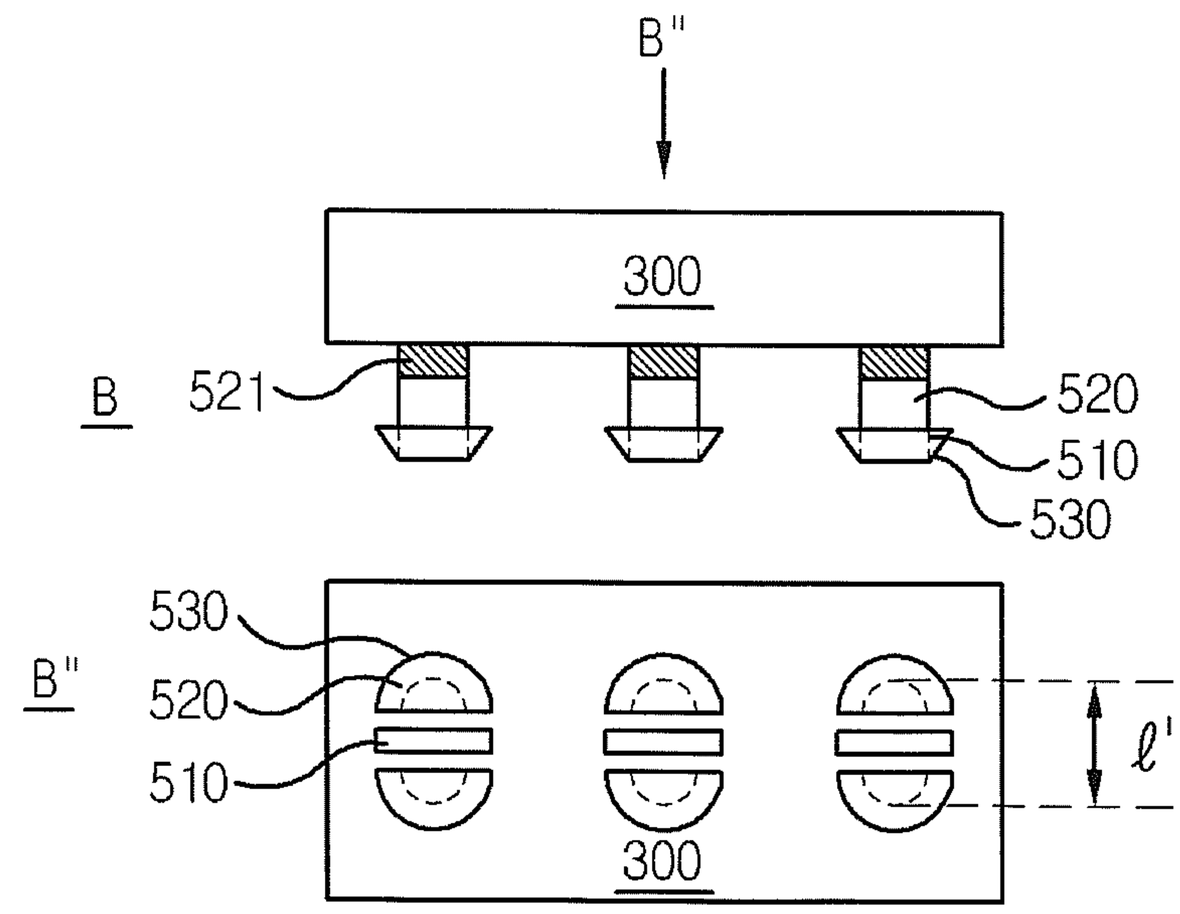

B''
300
B
521
520
510
530
B''
530
520
510
300
ℓ'

FIG. 6

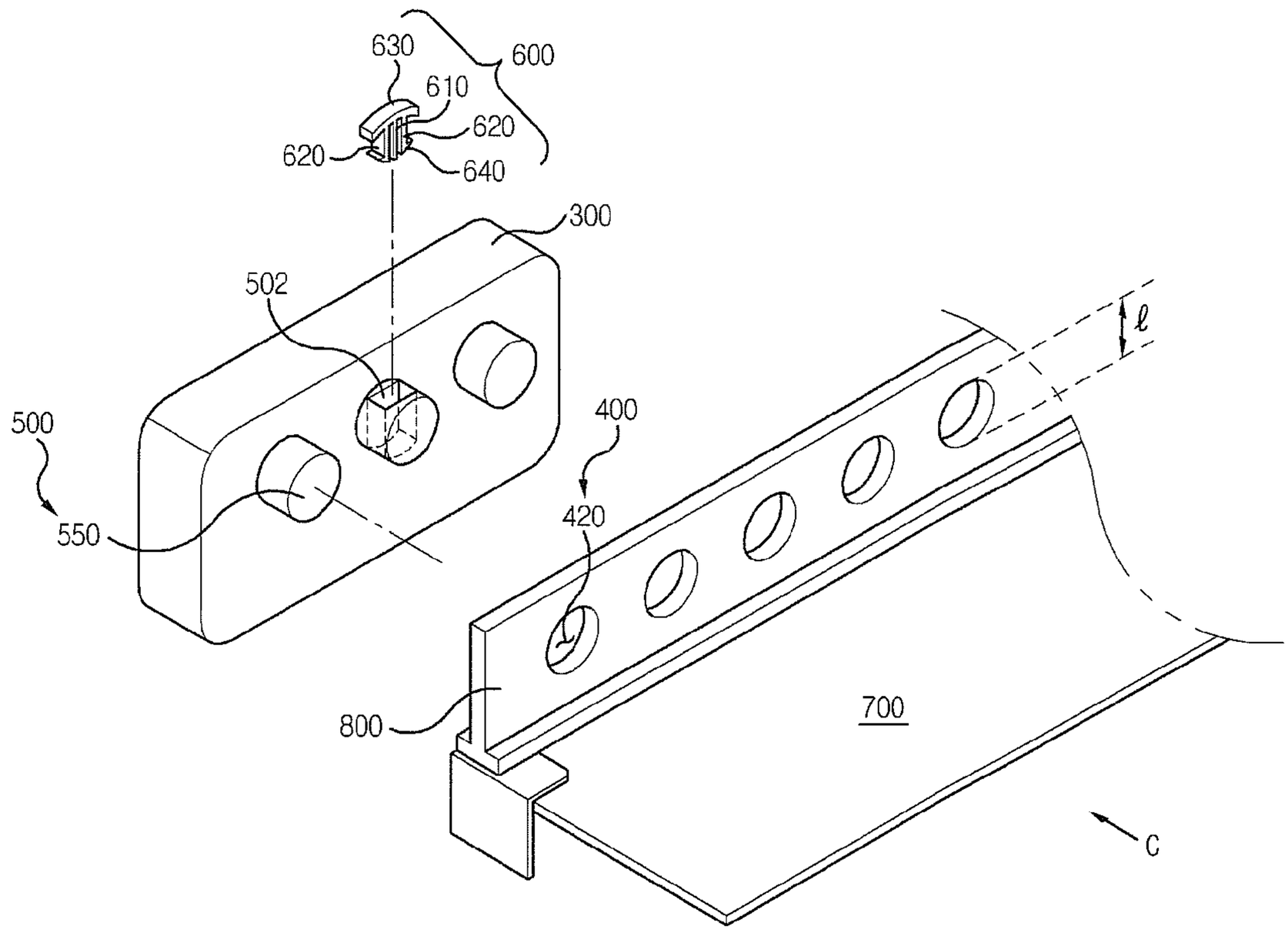

630
600
610
620
620
640
300
502
500
550
400
420
ℓ
800
700
C

FIG. 7

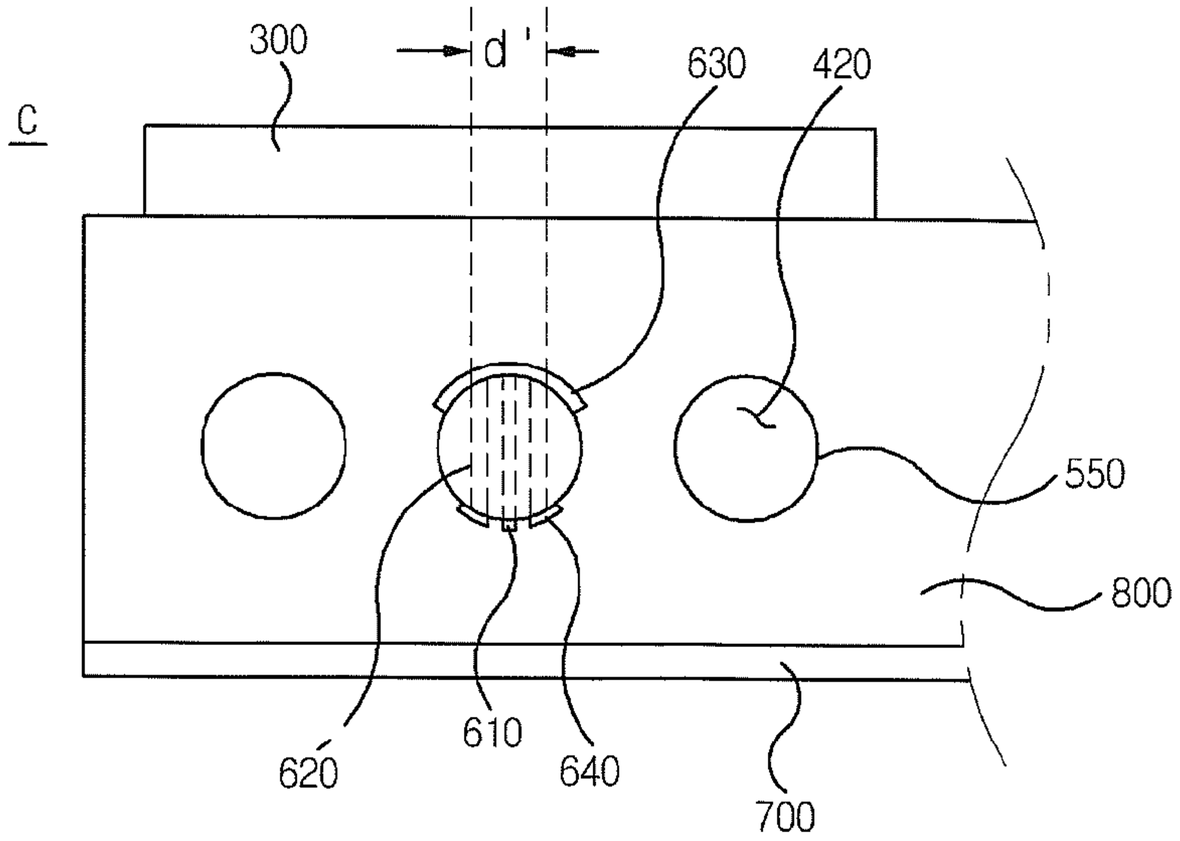

300
d'
630
420
C
550
800
620
610
640
700

FIG. 8

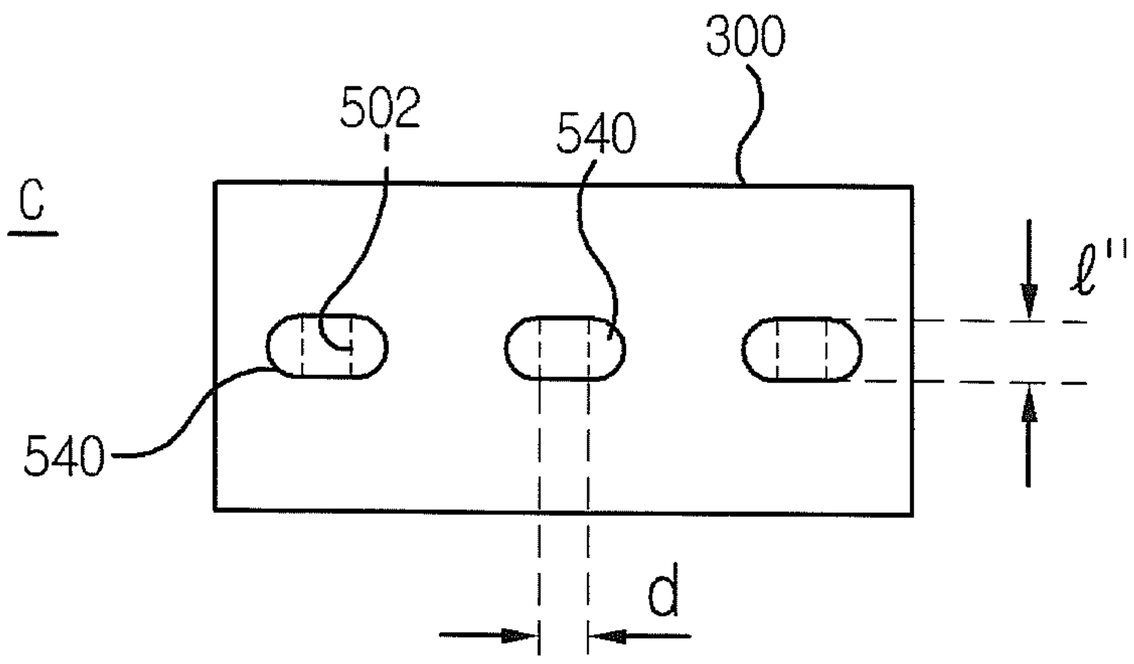


FIG. 9

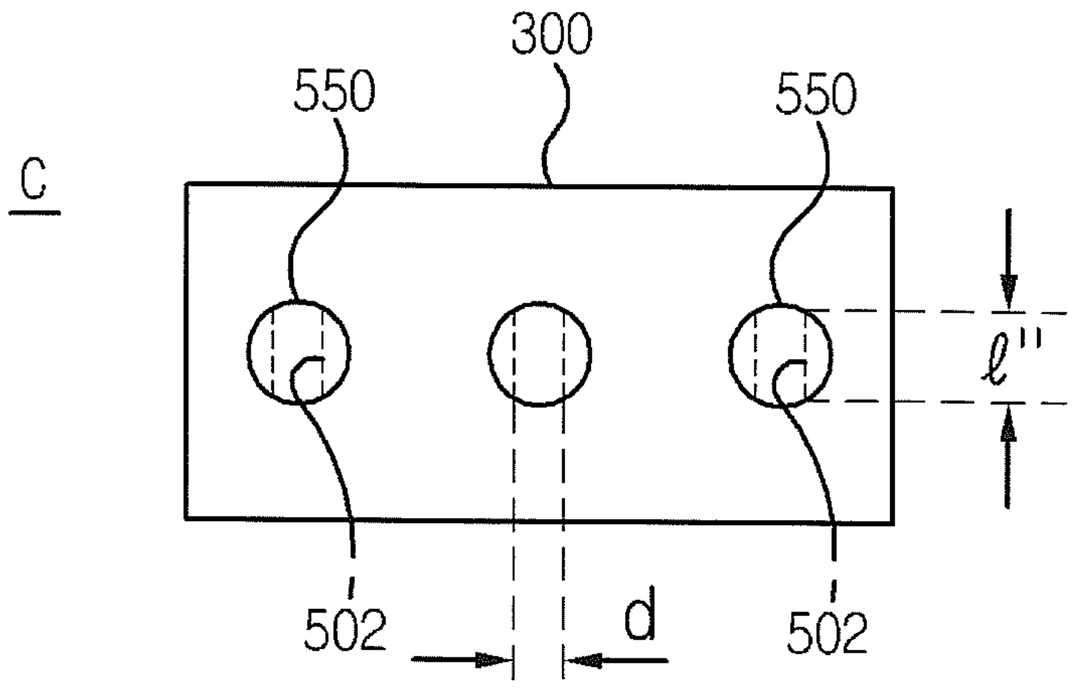


FIG. 10

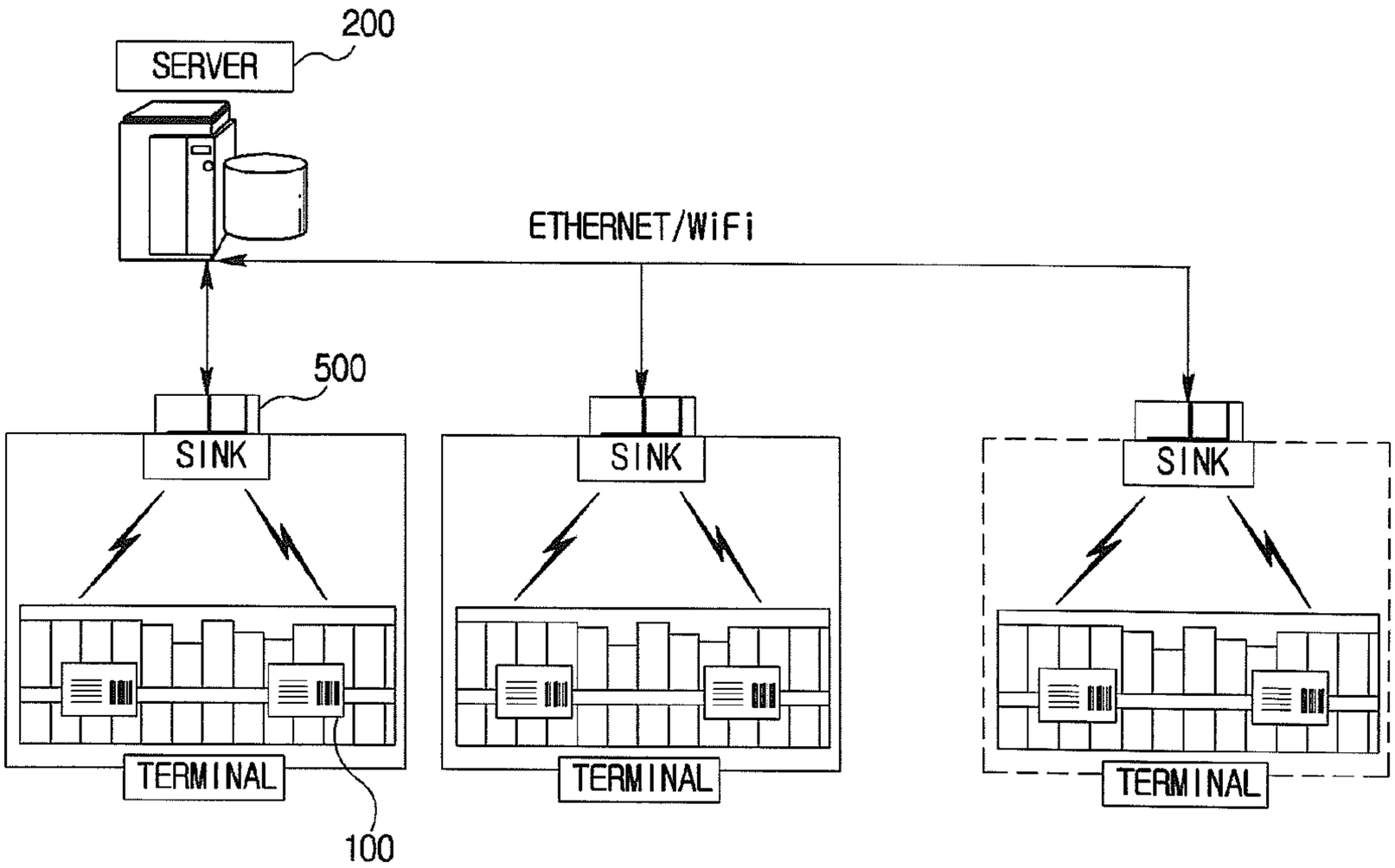

200
SERVER
ETHERNET/WiFi
500
SINK
SINK
SINK
TERMINAL
TERMINAL
TERMINAL
100

FIG. 11

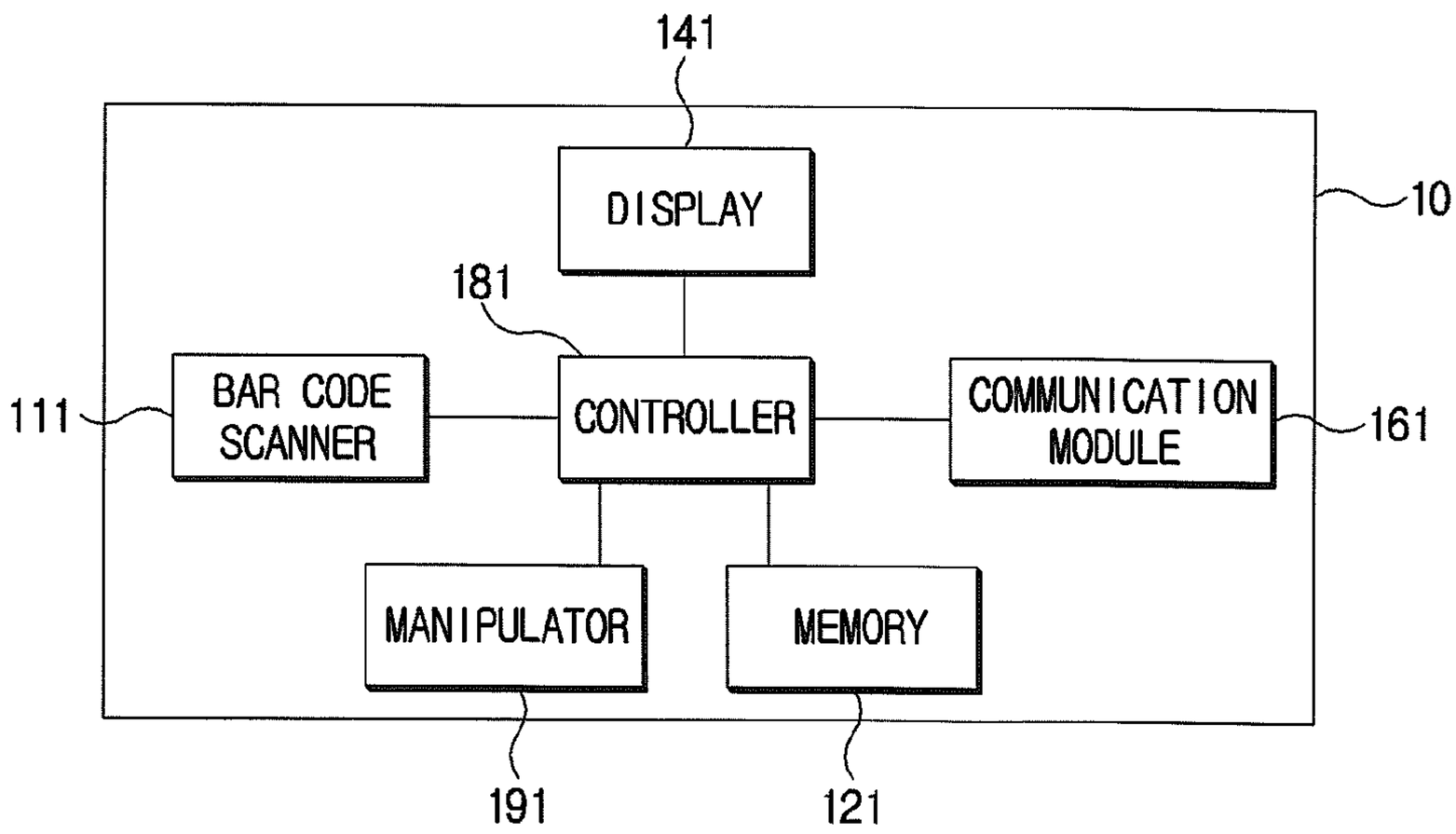

141
DISPLAY
101
181
111
BAR CODE SCANNER
CONTROLLER
COMMUNICATION MODULE
161
MANIPULATOR
MEMORY
191
121

FIG. 12

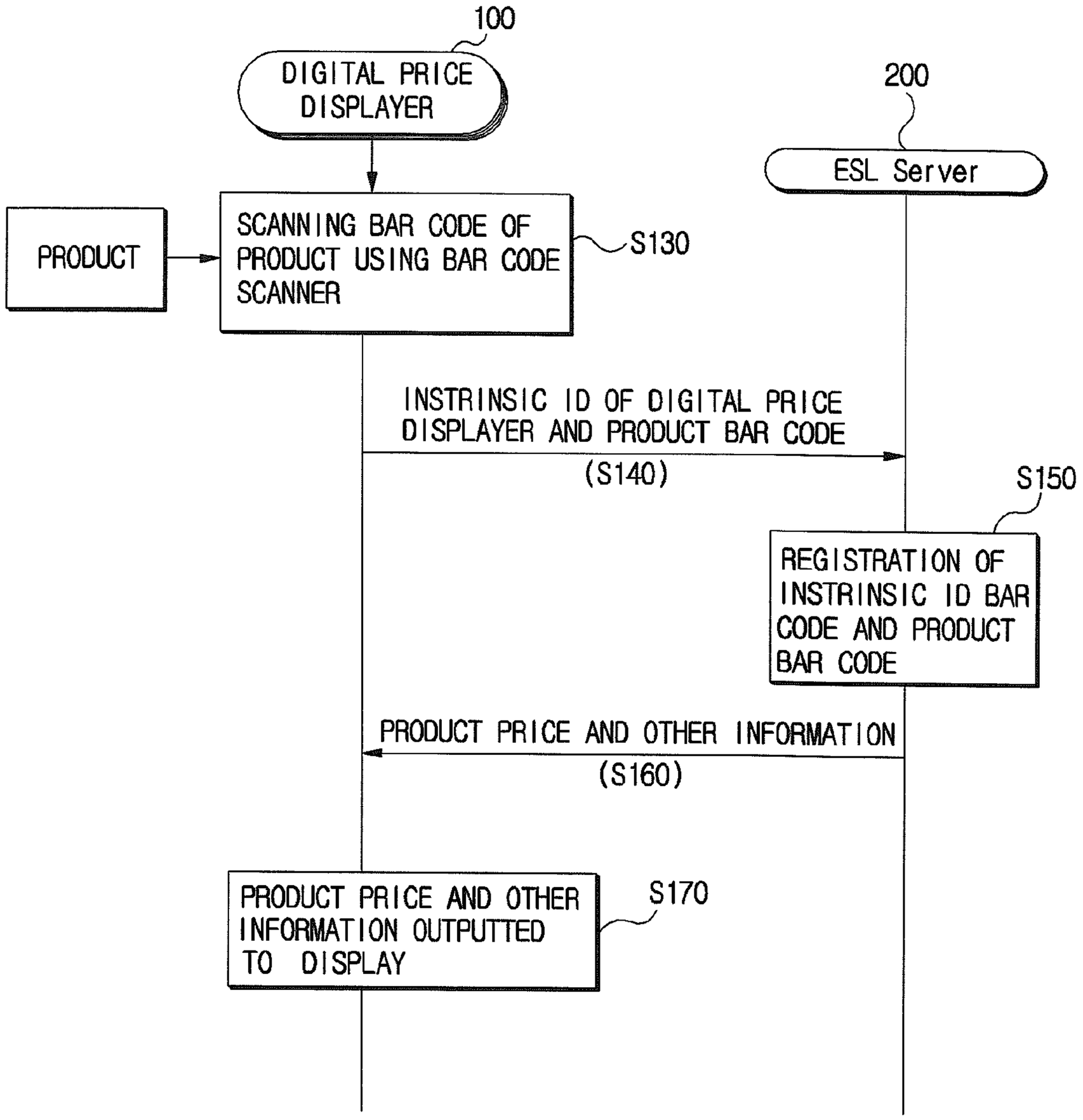

100
DIGITAL PRICE DISPLAYER
200
ESL Server
PRODUCT
SCANNING BAR CODE OF PRODUCT USING BAR CODE SCANNER
S130
INSTRINSIC ID OF DIGITAL PRICE DISPLAYER AND PRODUCT BAR CODE
(S140)
S150
REGISTRATION OF INSTRINSIC ID BAR CODE AND PRODUCT BAR CODE
PRODUCT PRICE AND OTHER INFORMATION
(S160)
PRODUCT PRICE AND OTHER INFORMATION OUTPUTTED TO DISPLAY
S170

FIG. 13

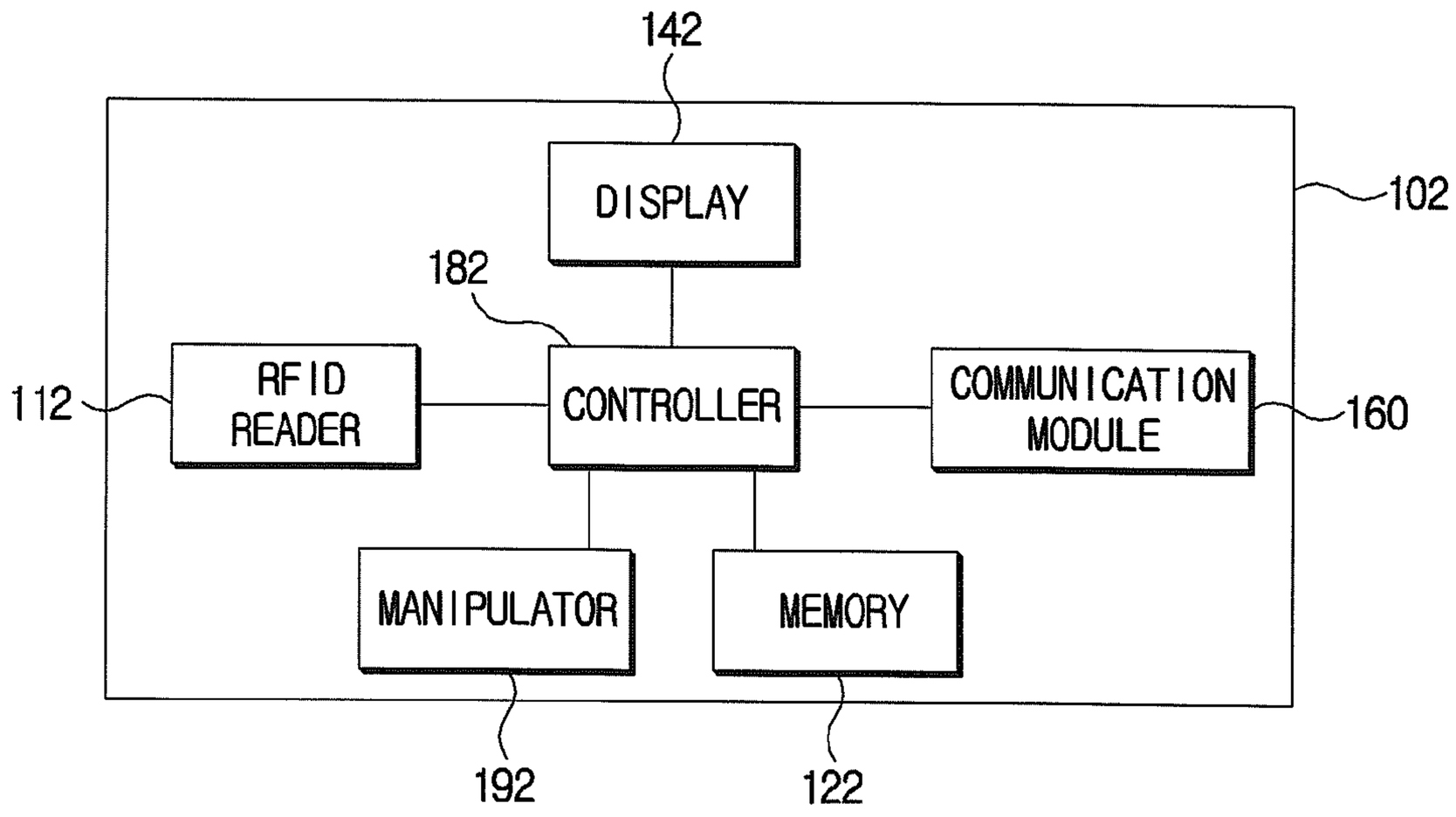

142
DISPLAY
102
182
112
RFID READER
CONTROLLER
COMMUNICATION MODULE
160
MANIPULATOR
MEMORY
192
122

FIG. 14

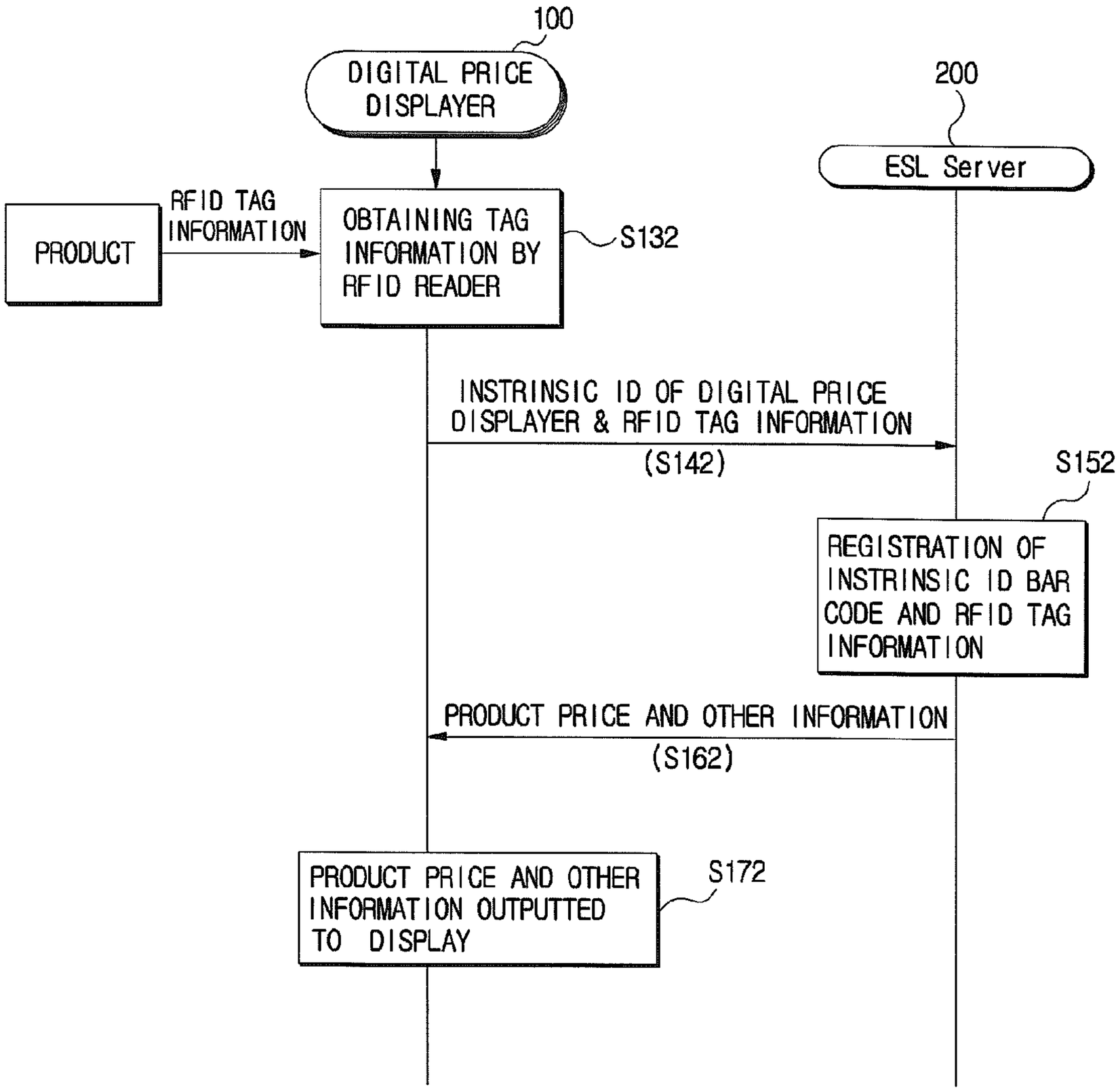

100
DIGITAL PRICE DISPLAYER
200
ESL Server
PRODUCT
RFID TAG INFORMATION
OBTAINING TAG INFORMATION BY RFID READER
S132
INSTRINSIC ID OF DIGITAL PRICE DISPLAYER & RFID TAG INFORMATION
(S142)
S152
REGISTRATION OF INSTRINSIC ID BAR CODE AND RFID TAG INFORMATION
PRODUCT PRICE AND OTHER INFORMATION
(S162)
PRODUCT PRICE AND OTHER INFORMATION OUTPUTTED TO DISPLAY
S172

FIG. 15

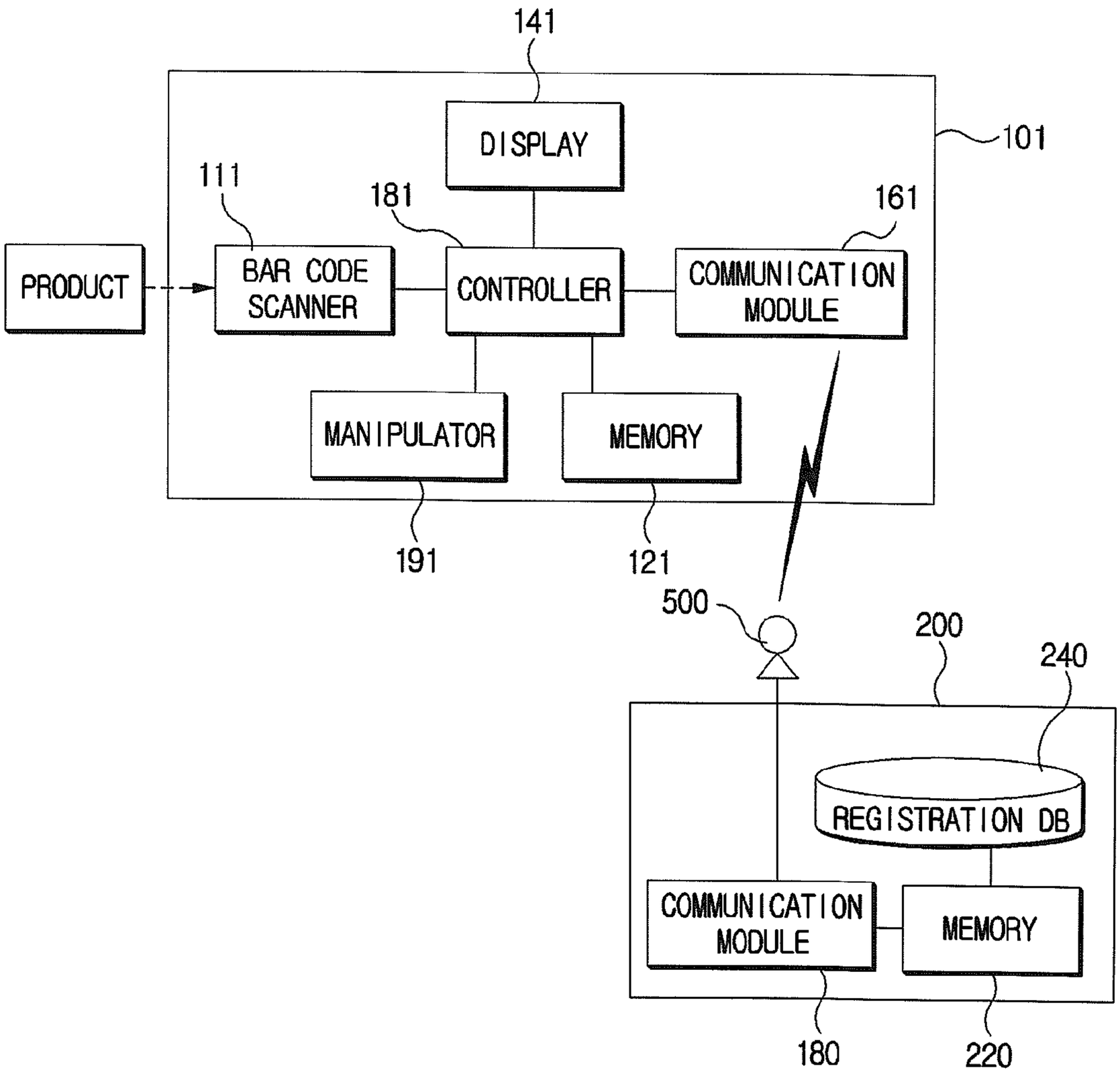

141
DISPLAY
101
111
181
161
PRODUCT
BAR CODE SCANNER
CONTROLLER
COMMUNICATION MODULE
MANIPULATOR
MEMORY
191
121
500
200
240
REGISTRATION DB
COMMUNICATION MODULE
MEMORY
180
220

FIG. 16

DIGITAL PRICE DISPLAYER AND ESL SYSTEM COMPRISING THE SAME

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims the benefit under 35 U.S.C. §119 of Korean Patent Application Nos. 10-2009-0102737, filed Oct. 28, 2009 and 10-2009-0107735, filed Nov. 9, 2009, which are hereby incorporated by reference in their entirety.

BACKGROUND OF THE DISCLOSURE

1. Field of the Invention

The present disclosure relates to a digital price displayer, and more particularly to a digital price displayer capable of displaying prices and specifications of products in real time, and conveniently inputting merchandise information, and an electronic shelf label (ESL) system comprising the same.

2. Description of the Related Art

Recently, stores such as department stores and convenient stores display a large variety of products on a shelf concomitant with development in distribution and logistics, where the shelf is mounted with a price display unit for displaying prices and information on products exhibited on the shelf.

The price display unit is formed in such a manner that a plate is fixed on a shelf, and the plate is attachably and detachably installed with a display panel provided with a display area on which a unit price, a country of origin, characteristic and a promotional information, etc., are shown.

However, most of the conventional price display units are disadvantageous in that the plate is fixed at a certain position, and it is cumbersome for a store manager to change the position of the plate where necessary. Another disadvantage is that the display panel is attachable and detachable to allow a customer to inadvertently or by mistake drop or separate the display panel from the plate to the fear of losing the display panel.

Still another disadvantage is that waste of materials is excessive because of disposal of the conventional price display unit if sales of products are not realized due to price changes or out of stock of products, as the display panels mounted at the plate must be differently manufactured according to the exhibited products to expresses a variety of shapes, colors and characters by one model of the display panel.

Meanwhile, large discount stores use a price display plate configured to display information and prices on products that are displayed. The conventional price display plate is inconvenient in its manual product information input method to decrease efficiency in product information input process, because a user must manually describe each product name and price on the price display plate or insert a board described with the product names and prices.

As a way of removing inconveniences involved in the conventional product information input method, a digital price displayer using an electronic display device has emerged. The digital price displayer is to display information and price of an exhibited product on a display device such as LCD (Liquid Crystal Display) capable of displaying desired information.

The digital price displayer may enhance the efficiency of product information input work by inputting information to be displayed using a keyboard, dispensing with a mechanical work of inserting a board or writing the information using a writing instrument. It is still cumbersome for a user to personally input the information in the digital price displayer.

BRIEF SUMMARY

The present disclosure has been made in view of the foregoing problems, and it is a first object of the present disclosure to provide a digital price displayer configured to allow a store manager to easily grasp stocks and sales status of products and to easily attach to or detach from a shelf on which products are displayed, whereas customers have difficulty in separating from the shelf.

Furthermore, it is a second object of the present disclosure to provide a digital price displayer configured to relieve a user from cumbersomeness of personally inputting merchandise information, thereby enabling the user to efficiently perform a merchandise information input operation.

It is a third object of the present disclosure to provide an ESL (Electronic Shelf Label) system including a digital price displayer configured to conveniently input merchandise information.

Technical subjects to be solved by the present disclosure are not restricted to the above-mentioned description, and any other technical problems not mentioned so far will be clearly appreciated from the following description by the skilled in the art.

In one general aspect of the present disclosure, a digital price displayer is provided, the displayer comprising: a power supplier mounted on a product-displayed shelf for supplying a power; a display main body attachable to and detachable from the shelf and receiving power supplied from the power supplier, and outputting a price, a specification and an advertisement image of a product displayed on the shelf; an accommodator provided at the shelf, formed at one side with an anode and formed at the other side with a cathode for the display main body to be electrically connected to the power supplier if the display main body is fixed to the accommodator; and a coupler provided at the display main body to be slidingly coupled with the accommodator for electrical connection with the anode and the cathode and to prevent from being separated from the accommodator.

In some exemplary embodiments of the present disclosure, the shelf may be installed with a fence to fix the display main body as the coupler is coupled to the accommodator, wherein the accommodator is formed lengthwise of the fence.

In some exemplary embodiments of the present disclosure, the power supplier may include a charger electrically connecting the anode, the cathode and an outside power line, and an overload preventing circuit installed between the outside power line and the charger to prevent the charger from being damaged by overload.

In some exemplary embodiments of the present disclosure, the displayer may further include a DC adapter between the overload preventing circuit and the outside power line to convert an AC (Alternating Current) supplied from the outside power line to a DC (Direct Current).

In some exemplary embodiments of the present disclosure, the display main body may receive the price, the specification and the advertisement image of the product displayed on the shelf from a sever via a wired network or a wireless network.

In some exemplary embodiments of the present disclosure, the display main body may include a body fixed at the shelf, a display module embedded in the body to change and output the price, the specification and the advertisement image of the product displayed on the shelf, a communication module embedded in the body to communicate with the server via a wired network or a wireless network, an MPU (Micro Pro-

cessor Unit) embedded in the body to control a screen output of the display module and communication with the communication module, and a charger embedded in the body to supply a power for driving the display module, the communication module and the MPU.

In some exemplary embodiments of the present disclosure, the accommodator may be a slit-shaped rail or a plurality of holes, where the rail or the holes are provided at one side with an anode and at the other side with a cathode along a lengthwise direction of the fence.

In some exemplary embodiments of the present disclosure, the coupler may include a pin-shaped first piece accommodated into the accommodator, second pieces each discretely formed at each side of the first piece to correspond to a width of the accommodator to allow an elastic deformation and an elastic restoration, a first hook provided at a distal end of the second piece to be slidingly hitched by the accommodator and to prevent the display main body from being separated, wherein an outside of the second piece is provided with an electrode terminal contacting the anode and the cathode to be electrically connected to the power supplier.

In some exemplary embodiments of the present disclosure, the first hook may be formed with a slope narrowing toward the first piece side as it goes to a distal end thereof.

In some exemplary embodiments of the present disclosure, the display main body may further include a fixture slidingly coupled to the coupler and fixed across the fence to prevent separation from the coupler, wherein the fixture is coupled in a state the accommodator and the coupler are fastened.

In some exemplary embodiments of the present disclosure, the coupler may be a protrude piece protruded to correspond to the rail and through which a slit passes in an orthogonal direction from a direction of forming the rail.

In some exemplary embodiments of the present disclosure, the coupler may be at least one protruder protruded to correspond to the hole and through which a slit passes in an orthogonal direction from a lengthwise direction of the fence.

In some exemplary embodiments of the present disclosure, the fixture may include a third piece longer than or equal to the slit, fourth pieces each corresponding to a width of the slit and each discretely formed across the third piece to allow an elastic deformation and an elastic restoration, a fixture piece fixing one end of the third piece and one end of the fourth piece to be fixed at one side of the slit, and a second hook provided at the other end of the fourth piece.

In some exemplary embodiments of the present disclosure, the second hook may be formed with a slope narrowing toward the third piece side as it goes to a distal end thereof.

In another general aspect of the present disclosure, a digital price displayer is provided, the displayer comprising: a bar code scanner recognizing a product by scanning a bar code of the product; a memory storing information of the product; a display device configured to display information of the product stored in the memory; a communication module configured to perform a communication with an ESL (Electronic Shelf Label) server; and a controller configured to transmit the bar code information of the product recognized by the bar code scanner to the ESL server via the communication module, to receive the information of the product from the ESL server and store the information at the memory.

In some exemplary embodiments of the present disclosure, the bar code scanner may be so installed as to scan a bar code of a product arranged on the upper surface of a plane on which the display device is mounted.

In still another general aspect of the present disclosure, a digital price displayer is provided, the displayer comprising: an RFID (Radio-Frequency IDentification) reader configured to read out an RF tag attached to a product; a display device configured to display information of the product; a communication module configured to perform a communication with an ESL (Electronic Shelf Label) server; and a controller configured to transmit tag information of the product recognized by the RFID reader to the ESL server via the communication module, to receive the product information of the tag from the ESL server and display the information on the display device.

In some exemplary embodiments of the present disclosure, the displayer may further include a memory configured to store information of the product, wherein the display device may output information of the product stored in the memory, and the controller may store the product information of the tag transmitted from ESL server in the memory.

In still further general aspect of the present disclosure, an ESL system is provided, the ESL system comprising: a digital price displayer configured to read out information recorded on a tag attached to a product and transmit the information; and an ESL server configured to receive the information transmitted from the digital price displayer and to transmit information corresponding thereto to the digital price displayer, wherein the digital price displayer may include a tag read-out module configured to read out information recorded on a tag attached to a product, a display device configured to display the information of the product, a first communication module configured to perform a communication with the ESL server, and a first controller configured to transmit the tag information of the product read out by the tag read-out module to the ESL server via the first communication module, to receive the product information of the tag from the ESL server and display the information on the display device, and wherein the ESL sever may include a second communication module configured to perform a communication with the digital price displayer, a memory configured to store the information of the product, and a second controller configured to retrieve the product information of the tag from the memory and transmit the information to the digital price displayer if the tag information is received from the digital price displayer via the second communication module.

In some exemplary embodiments of the present disclosure, the second controller of the ESL server may record in the memory a relationship between the digital price displayer that has transmitted the tag information and the product of the tag.

Additional advantages, objects, and features of the disclosure will be set forth in part in the description which follows and in part will become apparent to those having ordinary skill in the art upon examination of the following or may be learned from practice of the disclosure. The objectives and other advantages of the disclosure may be realized and attained by the structure particularly pointed out in the written description and claims hereof as well as the appended drawings.

It is to be understood that both the foregoing general description and the following detailed description of the present disclosure are exemplary and explanatory and are intended to provide further explanation of the disclosure as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are included to provide a further understanding of the disclosure and are incorporated in and constitute a part of this application, illustrate embodiment(s) of the disclosure and together with the description serve to explain the principle of the disclosure. In the drawings:

FIG. **1** is a conceptual diagram illustrating a coupled relationship of a digital price displayer according to an exemplary embodiment of the present disclosure;

FIG. **2** is a conceptual diagram illustrating a display main body which is a core section of the present invention according to an exemplary embodiment of the present disclosure;

FIGS. **3** and **4** are conceptual diagrams illustrating various exemplary embodiments of accommodator which is a core section of the present disclosure;

FIGS. **5** and **6** are conceptual diagrams illustrating various exemplary embodiments of coupler which is a core section of the present disclosure;

FIG. **7** is an exploded perspective view illustrating a coupled relationship of a digital price displayer according to another exemplary embodiment of the present disclosure;

FIG. **8** is a rear surface conceptual diagram illustrating a coupled relationship of a digital price displayer according to another exemplary embodiment of the present disclosure;

FIGS. **9** and **10** are conceptual diagrams illustrating various exemplary embodiments of coupler which is a core section of the present disclosure;

FIG. **11** is a conceptual diagram illustrating a schematic configuration of an ESL system according to an exemplary embodiment of the present disclosure;

FIG. **12** is a block diagram illustrating a digital price displayer according to another exemplary embodiment of the present disclosure;

FIG. **13** is a flowchart illustrating a product information display method in an ESL system including a digital price displayer of FIG. **12**;

FIG. **14** is a block diagram illustrating a digital price displayer according to still another exemplary embodiment of the present disclosure;

FIG. **15** is a flowchart illustrating a product information display method in an ESL system including a digital price displayer of FIG. **14**; and

FIG. **16** is a block diagram illustrating an ESL system consisting of a digital price displayer and an ESL server according to an exemplary embodiment of the present disclosure.

DETAILED DESCRIPTION

The suffixes 'module' and 'unit' may be used for elements in order to facilitate the disclosure. Significant meanings or roles may not be given to the suffixes themselves and it is understood that the 'module' and 'unit' may be used together or interchangeably. The term "providing (provide, provided)" may encompass such terms as "generating (generate, generated)", and "producing (produce, produced)".

Hereinafter, exemplary embodiments of the present disclosure are described in detail with reference to the accompanying drawings. In the drawings, sizes or shapes of constituent elements may be exaggerated for clarity and convenience.

Particular terms may be defined to describe the disclosure in the best mode as known by the inventors. Accordingly, the meaning of specific terms or words used in the specification and the claims should not be limited to the literal or commonly employed sense, but should be construed in accordance with the spirit and scope of the disclosure. The definitions of these terms therefore may be determined based on the contents throughout the specification. Acronyms are used extensively throughout the description to avoid excessively long descriptive phrases. The meaning will be clear from the context of the description.

FIG. **1** is a conceptual diagram illustrating a coupled relationship of a digital price displayer according to an exemplary embodiment of the present disclosure, FIG. **2** is a conceptual diagram illustrating a display main body which is a core section of the present invention according to an exemplary embodiment of the present disclosure, FIGS. **3** and **4** are conceptual diagrams illustrating various exemplary embodiments of accommodator which is a core section of the present disclosure, and FIGS. **5** and **6** are conceptual diagrams illustrating various exemplary embodiments of coupler which is a core section of the present disclosure.

The digital price displayer according to the present disclosure may include a display main body **300** fixed to a shelf, an accommodator **400** provided at a fence **800** and a coupler **500** provided at display main body **300**.

A power supplier **900** may supply an electric power to the display main body **300** (described later in detail) by being mounted at one side of the shelf **700** on which products are displayed.

The display main body **300** attachably and detachably coupled to the shelf **700** is charged by the power supplied from the power supplier **900** to allow prices, specifications and advertisement images of the products displayed on the shelf **700** to be displayed. The display main body **300** also provides a space for the coupler **500** (described later).

The accommodator **400** is formed at one side lengthwise of the shelf **700** with an anode **401** and at the other side with a cathode **402** for the display main body **300** to be electrically connected to the power supplier **900** if the display main body **300** is fixed to the accommodator **400**. The accommodator **400** may use what is on existing facilities such as an existing shelf or an assembled angle.

A coupler **500** is provided at the display main body **300** to be slidingly coupled with the accommodator for electrical connection with the anode **401** and the cathode **402** and to prevent from being separated from the accommodator. That is, the coupler **500** may be easily coupled to the accommodator **400** but structurally needs an additional separating tool for being separated from the accommodator **400**.

The present disclosure may be implemented and applied based on the above-mentioned configuration, and in order to describe other exemplary embodiments of the present disclosure, description to each of the following essential elements will be given.

First of all, the shelf **700** may be installed with a fence **800** to fix the display main body **300** to the accommodator **400**, and the accommodator **400** may be formed lengthwise of the fence **800**. The fence **800** may be mounted along a margin of the shelf **700** on which the products (not shown) are arranged, and provide a space for the accommodator **400** and a space for the display main body **300** so that the products should not be dropped from the shelf **700**.

The power supplier **900** that supplies a power to the display main body **300** may include a charger **910** and an overload preventing circuit **920**. The charger **910** may electrically connect the anode **401** and the cathode **402** mounted across the accommodator **400** to an outside power line **901**. The overload preventing circuit **920** may be mounted between the outside power line **901** and the charger **910** to prevent the charger **910** from being damaged by an overload. A DC adapter **930** may be further provided between the overload preventing circuit **920** and the outside power line **901** for converting AC (Alternating Current) supplied from the outside power line **901** to DC (Direct Current).

Therefore, the power supplier **900** can continuously supply a power to the display main body **300** while being connected to the outside power line **901**, and simultaneously charge an operating power of the display main body **300** to the charger **910**. Furthermore, the power supplier **900** can supply a power

to the display main body **300** mounted at the fence **800** until the charged operation power is consumed if power supply is interrupted due to blackout or failure of the outside power line.

The display main body **300** may receive prices, specifications and advertisement images of the products displayed on the shelf via a server (not shown) through a wired or wireless network. The display main body **300** may be connected to the server through the wired or wireless network to additionally mount a small-sized image cam or a detection sensor so that stocks of a relevant product or a position of a product to be sought after can be easily grasped.

To this end, as shown in FIG. **2**, the display main body **300** may include a body **310**, a display module **320**, a communication module **330**, an MPU (Micro Processor Unit) **340** and a charger **350**, where an unmarked reference numeral **301** is a manipulating button.

The body **310** which is fixed at the fence **800** may provide a space for embedding the display module **320**, the communication module **330**, the MPU **340**, and the charger **350** (described later).

The display module **320** may be embedded in the body **310** to provide a screen configured to change and output prices, specifications and advertisement images of products arranged on the shelf **700**. The communication module **330** may be embedded in the body **310** to receive the prices, specifications and advertisement images of products arranged on the shelf **700** from the server via the wired or wireless network and transmit to the display module **320**.

The MPU **340** may be embedded in the body **310** to control a screen output of the display module **320** and the communication with the communication module **330** and to perform a series of calculations resultant from transmission and receipt of an amount of information processed by the screen output process and the communication process.

The charger **350** may be embedded in the body **310** to be electrically connected to the power supply **900** in a case the body **310** is fixed at the fence **800**, and supply a power for driving the display module **320**, the communication module **330** and the MPU **340**.

The accommodator **400** may be a slit-shaped rail **410** formed along a lengthwise direction of the fence **800** or a plurality of holes **420** formed along a lengthwise direction of the fence **800**, where the rail **410** may be coupled with the coupler **500** (described later) having a corresponding shape as shown in FIG. **5** or the coupler **500** having a corresponding shape as shown in FIG. **6**.

At this time, the rail **410** may be provided at one side with the anode **401** and at the other side with the cathode **402** along a lengthwise direction of the fence **800**, and a hole **420** is provided at one marginal side with the anode **401** and the other marginal side with the cathode **402**. The fence **800** is entirely isolated with an insulating material to prevent a user from receiving an electric shock due to carelessness except for a portion where the anode **401** and the cathode **402** are coupled with the coupler **500** (described later).

The coupler **500** may be easily coupled with the accommodator **400** but have a configuration in which it is difficult to separate the coupler **500** from the accommodator **400**, that is, the fence **800** without a separate tool, and may be formed with a first piece **510**, a second piece **520** and a first hook **530**.

The pin-shaped first piece **510** may be accommodated into the accommodator **400**, i.e., the rail **410** or the holes **420**, to function as a framework of the coupler **500**. Each of the second pieces **520** may be discretely formed at each side of the first piece **510** to correspond to a width (l) of the accommodator, to allow an elastic deformation and an elastic restoration, where an entire length (l') toward the first piece **510** from each outside of the second pieces **520** may be equal to the width (l).

The first hook **530** may be provided at a distal end of the second piece **520** and may be formed with a slope narrowing toward the first piece **510** as it goes to a distal end thereof to be slidingly hitched by the accommodator **400** and to prevent the display main body **300** from being separated, where the outside of the second piece **520** is provided with an electrode terminal **521** contacting the anode **401** and the cathode **402** to be electrically connected to the power supplier **900** in a case the coupler **500** is inserted into and coupled with the accommodator **400**.

The digital price displayer according to the present disclosure may be applied with another exemplary embodiment as shown in FIGS. **7** and **8**.

FIG. **7** is an exploded perspective view illustrating a coupled relationship of a digital price displayer according to another exemplary embodiment of the present disclosure, and FIG. **8** is a rear surface conceptual diagram illustrating a coupled relationship of a digital price displayer according to another exemplary embodiment of the present disclosure.

Referring to FIGS. **7** and **8**, the digital price displayer may include a fence **800** provided on the shelf **700**, the display main body **300** fixed at the fence **800**, the accommodator **400** provided at the fence **800**, the coupler **500** provided at the display main body **300** and a fixture **600** fixing the accommodator **400** with the coupler **500**. The fence **800**, the display main body **300** and the accommodator **400** are similar to those described in the first exemplary embodiment, such that explanation thereto is omitted for convenience sake.

For reference, reference numerals not shown in FIGS. **7** and **8** may be referred to those in FIGS. **1** through **6**, and it should be noted that the accommodator **400** illustrated in FIGS. **7** and **8** refers to the holes **420**, and the coupler **500** refers to a protrude **550**.

The anode **401**, the cathode **402** and the electrode terminal **521** are omitted in FIGS. **7** through **10** for convenience sake, and the detailed coupled relationship among the anode **401**, the cathode **402** and the electrode terminal **521** should be referred to FIGS. **1** through **6**.

The coupler **500**, which is the protrude **550**, is provide at the display main body **300** to be accommodated into the accommodator **400**, i.e., the hole **420**, and may be a protruder piece **540** of FIG. **9**, or the protruder **550** of FIG. **10**.

One or more protrude pieces **540** may be a protruder or protruders from the display main body **300** to correspond to the rail **410** of FIG. **3** and through which a slit **502** passes in an orthogonal direction from a direction of forming the rail **410**.

At least one or more protruders **550** are protruded from the display main body **300** to correspond to the hole **420** and through which a slit **502** passes in an orthogonal direction from a lengthwise direction of the fence **800**, where each width (l") of the protrude piece **540** and the protrude **550** correspond to the width (l) of the accommodator **400**.

The fixture **600** may be slidingly coupled with the coupler **500** to prevent from being separated from the coupler **500**, both ends of which are fixed to fence **800**. Wherein the fixture **600** is coupled in a state the accommodator **400** and the coupler **500** are fastened. The fixture **600** may include a third piece **610**, a fourth piece **620**, a fixture piece **630** and a second hook **640**. The third piece **610**, equal to or longer than the slit **502**, may function as a center and a framework for being inserted into the slit **502**.

The fourth pieces **620** each corresponding to a width (d) of the slit **502** and each discretely formed across the third piece **610** to substantially form a predetermined distance (d') and to

allow an elastic deformation and an elastic restoration for insertion into and fixed at the slit **502**. The width (d) and the distance (d') are equal.

The fixture piece **630** fixing one end of the third piece **610** and one end of the fourth piece **620** to be hitched by and fixed at one side of the slit **502**.

The second hook **640** is provided at the other end of the fourth piece **620**, and is formed with a slope narrowing toward the side of the third piece **610** as it goes to a distal end thereof. The second hook **640** is slidingly coupled through the slit **502** to allow an elastic deformation and an elastic restoration of the fourth piece **620** and to prevent separation from the coupler **500**.

As apparent from novel idea of the digital price displayer according to the present disclosure, a sales manager is easily enabled to grasp stocks and sales status of products, and the digital price displayer can be easily attached to or detached from the shelf on which the products are arranged, whereas customers are given difficulty in separating the digital price displayer.

FIG. **11** is a conceptual diagram illustrating a schematic configuration of an ESL system according to an exemplary embodiment of the present disclosure.

Referring to FIG. **11**, the ESL system may include an ESL server **200** storing and distributing data for product management, and a digital price displayer **100** receiving the product information from the ESL server **200** and displaying the information. The digital price displayer may be installed at a good place of a stand on which products are arranged for the customers to look at, and display information (e.g., product name and price) of the product arranged on the nearby stand.

The ESL server **200** and the digital price displayer **100** may form a communication channel via a relay **500**. The ESL server **200** and the relay **500** may be connected to a wired network including Ethernet or a wireless network including wi-fi. The relay **500** and the digital price displayer **100** may be connected to the wireless network such as wi-fi and Bluetooth®.

FIG. **12** is a block diagram illustrating a digital price displayer according to another exemplary embodiment of the present disclosure.

Referring to FIG. **12**, a digital price displayer **101** may include a bar code scanner **111**, which is a product tag readout module, recognizing a product by scanning a bar code of the product, a memory **121** storing information of the product, a display device **141** configured to display information of the product stored in the memory **121**, a communication module **161** configured to perform a communication with an ESL (Electronic Shelf Label) server **200** (see FIG. **11**), and a controller **181** configured to transmit the bar code information of the product recognized by the bar code scanner **111** to the ESL server **200** via the communication module **161**, to receive the information of the product from the ESL server **200** and store the information at the memory **121**. Meanwhile, the digital price displayer **101** may further include a manipulator **191** receiving a manager instruction whereby the product information can be inputted.

The display device **141** may be a device including an LCD, a PDP, an LED and a CRT.

The bar code scanner **111** may be implemented in various manners. For example, the bar code scanner **111** may be so installed as to scan a bar code of a product arranged on the upper surface of a plane on which the display device **141** is mounted, which is designed to make it easy for a price display surface to face the product when the bar code on the product is to be recognized, because the price display surface of the price displayer generally faces a direction which is convenient to the user.

The bar code scanner **111** may take a shape in which the main body of the digital price displayer **101** is independently formed, and connected by a coil-type conductor wire.

The communication module in the ESL server **200** of FIG. **11** may communicate with the digital price displayer **101** (reference numeral **100** in FIG. **11**) via a separate relay **500**. In a case the relay **500** supports a short distance wireless communication such as Bluetooth® and Zigbee, the communication module **161** of the digital price displayer **101** may be a short distance communication module.

Furthermore, in a case the ESL server **200** and the digital price displayer **101** are directly connected to a wired network such as Ethernet, the communication module **161** of the digital price displayer **101** may be a wired network LAN (Local Area Network) card.

The manipulator **191** may receive an instruction by a store manager to allow the digital price displayer **101** to perform a work of inputting product information. A keypad of the manipulator **191** may be implemented by a user interface device.

The controller **181** may control operations of an entire element of the digital price displayer **101**. In a case the manipulator **191** receives an input instruction on the product information, the controller **181** may perform a product information display method as shown in FIG. **13**.

The product information display method illustrated in FIG. **13** may include recognizing, by a bar code scanner of the digital price displayer **100**, a bar code of a product (S**130**), transmitting, by the digital price displayer **100**, the recognized bar code information to the ESL server **200** (S**140**), receiving, by the ESL server **200**, the bar code information to register the digital price displayer **100** and a product (S**150**), transmitting, by the ESL server **200**, the information of the registered product to the registered digital price displayer **100** (S**160**), and displaying the received product information by the digital price displayer **100** (S**170**).

The step S**130** resembles a product bar code input process using a conventional bar code recognition terminal. In a case a store manager holds a product arranged (or to be arranged) on a nearby arrangement area of the digital price displayer **100**, and scans the bar code attached on the product using the bar code scanner of the digital price displayer **100**, the step S**130** is implemented.

In step S**140**, the digital price displayer **100** may transmit the recognized bar code information of the product and the identification information (e.g., ID) of the digital price displayer **100** to the ESL server **200** using the wireless communication network.

In step S**150**, the ESL server **200** may record a product to be displayed on a relevant digital price displayer **100** and the identification information (e.g., ID) of the digital price displayer **100** in an inner database.

In step S**160**, information (e.g., product name and price) of a product to be displayed on a relevant digital price displayer **100** may be transmitted to each registered digital price displayer **100**.

In step S**170**, the digital price displayer **100** may store the transmitted information of product in the inner memory, and display on the display device the information (e.g., product name and price) of a product displayed (or to be displayed) at a nearby arranged area.

The store manager manipulating the digital price displayer **100** may display the product information on the digital price displayer **100** in the following processes.

The manager managing the products arranged on the stand mounted with a plurality of digital price displayers **100** may scan the products arranged (or to be arranged) at a nearby arrangement area using the bar code scanner **111** of each digital price displayer **100**. As a result, the digital price displayer **100** may perform the steps S**130** and S**140**.

Successively, the ESL server **200** may perform the steps S**150** and S**160**, and the digital price displayer **100** may perform the S**170**, whereby the digital price displayer **100** is displayed with product name and price of the product arranged on the nearby arrangement area.

As expounded in the foregoing, according to the product information display method, the cumbersomeness of the manager personally inputting product information can be prevented to effectively perform the product information input process.

FIG. **14** is a block diagram illustrating a digital price displayer according to still another exemplary embodiment of the present disclosure.

Referring to FIG. **14**, a digital price displayer **102** may include an RFID (Radio-Frequency IDentification) reader **112** configured to read out an RF tag attached to a product, a memory **122** storing the product information, a display device **142** configured to display information of the product stored in the memory **122**, a communication module **160** configured to perform a communication with an ESL (Electronic Shelf Label) server **200** (see FIG. **11**), and a controller **182** configured to transmit tag information of the product recognized by the RFID reader **112** to the ESL server **200** via the communication module **160**, to receive the information of the product from the ESL server **200** and store the information on the memory **122**.

The digital price displayer **102** may further include a manipulator **192** configured to receive an instruction of a manager for inputting the product information.

The RFID reader **112** may be implemented in various manners. For example, the RFID reader **112** may be so installed as to scan an RFID tag of a product arranged on the upper surface of a plane on which the display device **142** is mounted. To be more specific, a ring-shaped loop antenna of the RFID reader **112** may be arranged at an edge of the display device **142**, which is designed to make it easy for a price display surface to face the product when the RFID tag on the product is to be recognized, because the price display surface of the price displayer generally faces a direction which is convenient to the user.

The RFID reader **112** may take a shape in which the main body of the digital price displayer **101** is independently formed, and connected by a coil-type conductor wire. The memory **122**, the display device **142** and the communication module **162** are identical in structure thereof with those in FIG. **12**, such that there will be no further repetitive explanation thereto.

The controller **182** may perform an operation similar to that of the controller in FIG. **12**, but may further perform an additional service using the characteristics of RFID which has a broader recognition scope than that of the bar code. For example, in a case the product information (e.g., product name and price) is displayed by the digital price displayer **102**, and an RFID of a product that does not match the product information displayed through the RFID reader **112** is detected for a predetermined period of time, the detection may be transmitted to the ESL server **200**. This has an advantage of advising the mismatched information to the store manager and allowing it to be corrected, in a case a product arranged on the stand is displaced or misplaced by another product due to mistakes of the manager or the customer. The controller **182** may perform a product information display method as shown in FIG. **15**.

A product information display method illustrated in FIG. **15** may include reading out, by the RFID reader of the digital price displayer **100**, a RFID tag attached to a product (S**132**), transmitting, by the digital price displayer **100**, the read-out tag information to the ESL server **200** (S**142**), receiving, by the ESL server **200**, the tag information to register the digital price displayer **100** and the product (S**152**), transmitting, by the ESL server **200**, the information of the registered product to the registered digital price displayer **100** (S**162**), and displaying the received product information by the digital price displayer **100** (S**172**).

The step S**132** resembles a product bar code input process using a conventional bar code recognition terminal.

In a case a store manager positions a product arranged (or to be arranged) on a nearby arrangement area of the digital price displayer **100** at a read-out area of the RFID reader of the digital price displayer **100**, the step S**132** is implemented.

In step S**142**, the digital price displayer **100** may transmit the recognized tag information of the product and the identification information (e.g., ID) of the digital price displayer **100** to the ESL server **200** using the wireless communication network.

In steps S**152** through S**172** are identical as those in FIG. **13**, such that no repetitive explanation will be given.

FIG. **16** is a block diagram illustrating an ESL system consisting of a digital price displayer and an ESL server according to an exemplary embodiment of the present disclosure.

Referring to FIG. **16**, the ESL system may include a digital price displayer **101** mounted with a tag read-out module for reading out information recorded in a tag attached to a product, an ESL server **200**, and a relay **500**.

The digital price displayer **101** may include a bar code scanner **111** as a tag read-out module, a display device **141** configured to display information of the product, and a communication module (first communication module) **161** configured to perform a communication with the ESL server **200**, and a controller (first controller) **181** configured to transmit tag information read out by the bar code scanner **111** to the ESL server **200** via the communication module (the first communication module) **161**, receive the product information of the tag from the ESL server **200**, and display the product information on the display device **141**.

The ESL server **200** may include a communication module (second communication module) **180** performing a communication with the digital price displayer **101**, a registration database **240** as a memory in which information of an arranged product and the digital price displayer **101** is recorded, a controller (second controller) **220** configured to receive the ID information of the digital price displayer **100** and tag information of arranged product from the digital price displayer **101** via the communication module (second communication module) **180** and to register the same on the registration database **240**. At this time, the controller (second controller) **220** may record in the registration database **240** (as a memory) a relationship between the digital price displayer **101** that has transmitted the tag information and the product of the tag.

The communication module **180** of the ESL server **200** may perform the communication with the digital price displayer **101** via a separate relay **500**. In a case the ESL server **200** and the relay **500** are connected via Ethernet such as a wired network, the communication module **180** may be a wired network LAN card.

Although the present disclosure has been described in terms of exemplary embodiments, the embodiments disclosed in this application are to be considered in all respects as illustrative and not limiting. It should be appreciated that variations may be made in the embodiments described by persons skilled in the art without departing from the scope of the present invention as defined by the following claims. For example, the persons skilled in the art would easily understand that the display main body according to the exemplary embodiments of the present disclosure is not limited to price and product information but can be variably applied to a place where a third person cannot easily separate the coupled relationship although it may be easily coupled by a manager when a lots of products are needed to be arranged in a neat manner, such as a library or a storage where a simple title or information are needed.

The scope of the disclosure is indicated by the appended claims rather than by the foregoing description, and all modifications or changes that come within the meaning and range of equivalency of the claims are intended to be embraced therein.

What is claimed is:

1. A digital price displayer, comprising:

a power supplier mounted on a product-displayed shelf for supplying a power;

a display main body attachable to and detachable from the shelf and receiving power supplied from the power supplier, and outputting a price, a specification and an advertisement image of a product displayed on the shelf;

an accommodator provided at the shelf, formed at one side with an anode and formed at the other side with a cathode for the display main body to be electrically connected to the power supplier if the display main body is fixed to the accommodator; and

a coupler provided at the display main body to be slidingly coupled with the accommodator for electrical connection with the anode and the cathode and to inhibit from being separated from the accommodator,

wherein the coupler comprises:

a pin-shaped first piece accommodated into the accommodator;

second pieces each discretely formed at each side of the first piece to correspond to a width of the accommodator to allow an elastic deformation and an elastic restoration; and

a first hook provided at a distal end of the second piece to be slidingly hitched by the accommodator and to inhibit the display main body from being separated,

wherein an outside of the second piece is provided with an electrode terminal contacting the anode and the cathode to be electrically connected to the power supplier.

2. The digital price displayer of claim **1**, wherein the shelf is installed with a fence to fix the display main body as the coupler is coupled to the accommodator, wherein the accommodator is formed lengthwise of the fence.

3. The digital price displayer of claim **1**, wherein the power supplier comprises:

a charger electrically connecting the anode, the cathode and an outside power line, and an overload preventing circuit installed between the outside power line and the charger to prevent the charger from being damaged by overload.

4. The digital price displayer of claim **3**, further comprising a DC adapter between the overload preventing circuit and the outside power line to convert an AC (Alternating Current) supplied from the outside power line to a DC (Direct Current).

5. The digital price displayer of claim **1**, wherein the display main body receives the price, the specification and the advertisement image of the product displayed on the shelf from a sever via a wired network or a wireless network.

6. The digital price displayer of claim **5**, wherein the display main body comprises:

a body fixed at the shelf, a display module embedded in the body to change and output the price, the specification and the advertisement image of the product displayed on the shelf, a communication module embedded in the body to communicate with the server via a wired network or a wireless network, an MPU (Micro Processor Unit) embedded in the body to control a screen output of the display module and communication with the communication module, and a charger embedded in the body to supply a power for driving the display module, the communication module and the MPU.

7. The digital price displayer of claim **2**, wherein the accommodator is a slit-shaped rail or a plurality of holes, where the rail or the holes are provided at one side with an anode and at the other side with a cathode along a lengthwise direction of the fence.

8. The digital price displayer of claim **1**, wherein the first hook is formed with a slope narrowing toward the first piece side as it goes to a distal end thereof.

9. The digital price displayer of claim **2**, wherein the display main body further comprises:

a fixture slidingly coupled to the coupler and fixed across the fence to prevent separation from the coupler, wherein the fixture is coupled in a state the accommodator and the coupler are fastened.

10. The digital price displayer of claim **9**, wherein the coupler may be a protrude piece protruded to correspond to the rail and through which a slit passes in an orthogonal direction from a direction of forming the rail.

11. The digital price displayer of claim **10**, wherein the coupler is at least one protruder protruded to correspond to the hole and through which a slit passes in an orthogonal direction from a lengthwise direction of the fence.

12. The digital price displayer of claim **11**, wherein the fixture comprises:

a third piece longer than or equal to the slit, fourth pieces each corresponding to a width of the slit and each discretely formed across the third piece to allow an elastic deformation and an elastic restoration, a fixture piece fixing one end of the third piece and one end of the fourth piece to be fixed at one side of the slit, and a second hook provided at the other end of the fourth piece.

13. The digital price displayer of claim **12**, wherein the second hook is formed with a slope narrowing toward the third piece side as it goes to a distal end thereof.

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